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INTRODUCTION to the DARKROOM SECTION

In line with the arrangement of the PHOTO-LAB-INDEX, a series of recommended procedures covering the design and construction of photographic darkrooms is being offered herewith. It is understood that these designs are suggestive only, and for this reason, dimensions are for the most part not given. Since no two available spaces in which darkrooms are to be built are likely to be the same, modifications of these basic plans will usually be necessary. The plans given, however, do show layouts which have been carefully prepared for maximum working efficiency, providing for a smooth flow of work and as little back tracking as possible.

The first requirement of a space for a good darkroom is that it must be capable of being made totally dark — not merely dusky. Modern high speed emulsions make this requirement more pointed than ever. This does not mean, however, that the darkroom should be a black dungeon . . . when color sensitive materials are not in use, safelights should be arranged to give as much light as possible consistent with safe handling of material.

At night practically any room can serve as a darkroom, provided shades are drawn or windows curtained with dark material to exclude streetlights, auto headlights, or light from neighboring windows. This will suffice for printing, but if fast negative materials are to be handled, a test should be made as described under *Testing Safelights* PHOTO-LAB-INDEX, page 264b.

Attics are suitable for permanent darkroom construction only when well insulated, otherwise they are likely to be too hot in summer and too cold in winter. Plumbing in attics, unless already installed, is also likely to be difficult and expensive. A cellar, if very damp, is just about as poor a location.

The ideal location is a dry, finished basement. Usually the temperature is fairly uniform, and hot and cold water connections are easy to make. Furthermore, if as occasionally happens, a drain gets stopped up, and the darkroom floor is flooded from the overflowing sink, little damage is done.

The principles involved in the design of professional darkrooms are very much the same, except that since both developing of negatives and printing are likely to be carried on at the same time, a two room layout is preferable. Separate small rooms should be provided for mixing chemicals, and for loading plateholders.

Plans for special service darkrooms, such as X-ray, Hospital, Engravers', Newspaper, Magazine, and Motion Picture, are also provided. These plans, also, are intended mainly to show layouts for efficient operation, rather than exact constructional details. Leeway is thus provided for accommodation of individual equipment to the space available, though the general arrangement shown is recommended for most efficient flow of work.

Future supplements will include additional plans for such types of darkrooms as demand will indicate.

Data on air conditioning, solution temperature control and the use of dry ice, and silica gel, are being prepared for future supplements, as well.

Note that frequently where none of the plans shown are satisfactory an excellent darkroom layout may be made by combining features of several of the plans given herein.

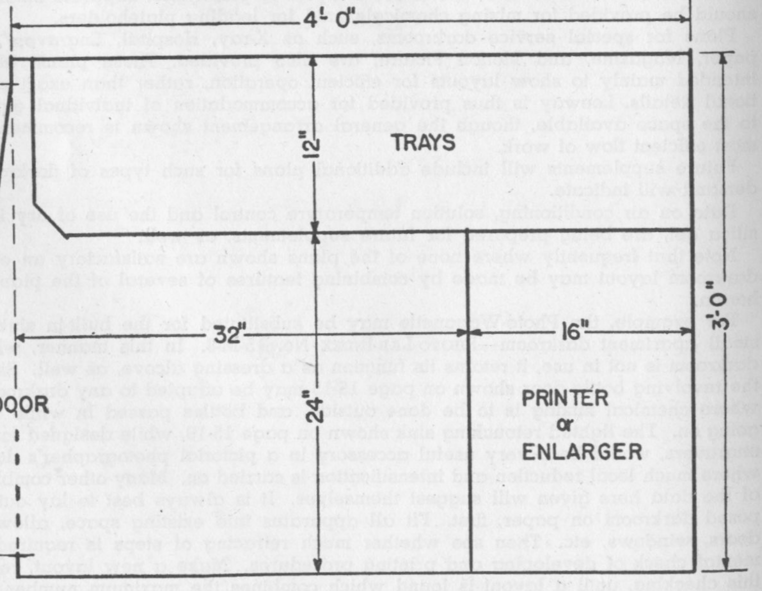
For example, the Photo-Wagonette may be substituted for the built-in sink in the small apartment darkroom—PHOTO-LAB-INDEX No. 15-M-3. In this manner, when the darkroom is not in use, it retains its function as a dressing alcove, as well. Similarly, the revolving bottle door shown on page 15-15 may be adapted to any darkroom plan where chemical mixing is to be done outside, and bottles passed in while work is going on. The lighted retouching sink shown on page 15-19, while designed for photoengravers, would be a very useful accessory in a pictorial photographer's darkroom where much local reduction and intensification is carried on. Many other combinations of the data here given will suggest themselves. It is always best to lay out a proposed darkroom on paper, first. Fit all apparatus into existing space, allowing for doors, windows, etc. Then see whether much retracing of steps is required, by a mental check of developing and printing procedures. Make a new layout, repeating this checking, until a layout is found which combines the maximum number of conveniences within the space allotted.

DARKROOMS FOR THE SMALL HOME OR APARTMENT

Makeshift arrangements involving the kitchen sink or the bathtub are not very satisfactory, though some of the best photographic achievements are often traced to them. The repeated labor of unpacking and repacking equipment, and blocking up windows each time work is to be done is highly discouraging and time consuming. A fairly satisfactory permanent darkroom can be made in a small closet—3'0" x 4'0" minimum. Such a closet, fitted with the arrangement of shelves shown, especially if located near kitchen or bathroom, for convenience in fetching water, can be quite satisfactory for negative developing, contact printing, and even enlarging, with a compact miniature enlarger. Or it can be used only for negative development, with printing and enlarging done by means of the "Photo-Wagonette," description and plans of which follow. Safelight should be positioned just over the developer tray, and about 3 feet above it. A white light should also be available, with a drop cord switch to prevent accidentally lighting it while handling sensitive material. Plumbing and electric wiring, if any, should be done by a licensed plumber and electrician.

If door cracks or clearance above threshold admit too much extraneous light they should be made light tight either by means of felt stripping or by a temporary black cloth curtain.

A darkroom as tiny as this can be made practical only by equipping it with the maximum number of shelves, cubby holes, and hangers, so that all equipment can remain in its proper place and nothing left on the table except that which is actually in use. Light-tight paper drawers are a great convenience, eliminating the need to re-wrap the paper each time the door must be opened. Chemical bottles should be stored on shelves below the work table, and trays on a rack similar to that shown on page 15-21, top of page. The graduate and hanger racks shown on that page are also essential to keeping a darkroom orderly.



A Darkroom in a 3' x 4' Closet

PHOTO-LAB-INDEX. Copyright 1941 - Morgan & Lester

THE PHOTO - WAGONETTE

An interesting solution of their apartment house portable darkroom problem is offered herewith in the form of a "photo-wagonette," a unit designed by Richard Carver Wood, architect and photographer. This design offers a very practical and complete solution in that it has everything in a compact unit. When not in use, the three units of which this photo-wagonette consists form an attractive piece of furniture, 4 feet 6 inches in length and 18 inches deep. Its height depends upon the type of enlarger available, which remains concealed when the convenient stool "C" is placed over it as a cover. The unit is conveniently wheeled into the kitchen or bathroom, plugged into the electrical outlet, and is ready for immediate operation.

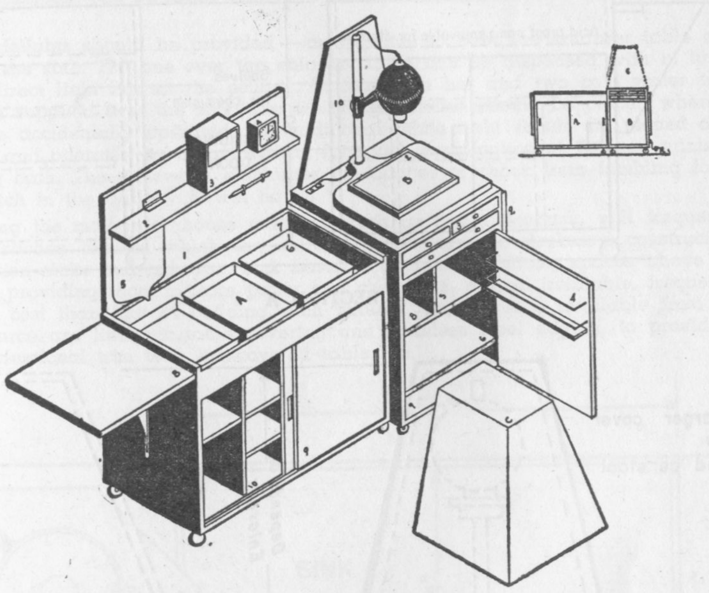


PHOTO-WAGONETTE. This is one of the solutions for the apartment darkroom facilities. See description below for details. Designed by Richard C. Wood, architect. Copyright Condé Nast Publications.

Description of Photo-Wagonette

A) Developing unit, B) Printing unit, and C) Cover for the enlarger (also used as a stool).

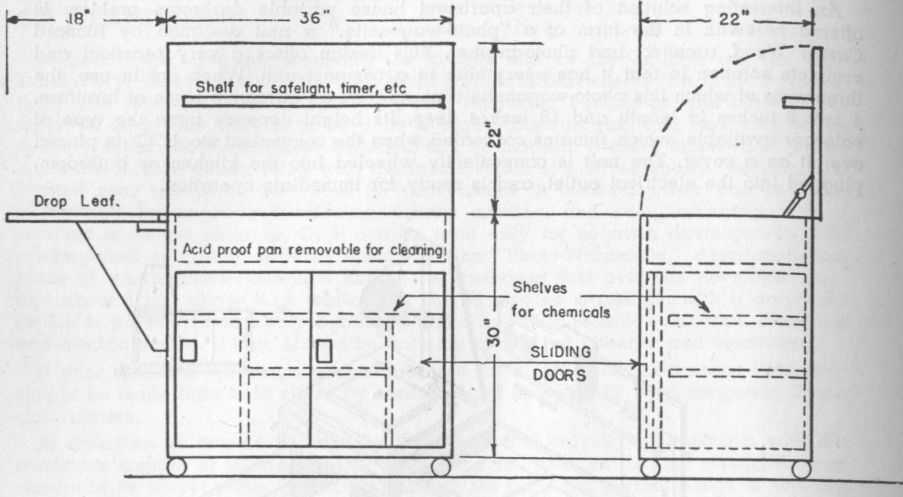
IN THE DEVELOPING UNIT: 1. Top of cabinet which lifts up to form shelves. 2. Shelf hinges down to hold 3, safelight; 4, timer, etc. 5. Viewing plate. 6. Space for three trays. 7. Acid proof trough which can be removed for cleaning. 8. Work table. 9. Sliding doors. 10. Shelves for storing chemicals, etc. 11. Extension cord.

IN THE PRINTING UNIT: 1. Enlarger. 2. Easel or paper holder. 3. Light proof drawer for printing paper. 4. Printing paper storage. 5. Equipment storage. 6. Film storage. 7. Paper cutter space. 8. Space for timer, safelight, etc. 9. Lowered shelf. 10. Part of unit C which remains in place. Unit C is the cover for the enlarger; also used as a stool.

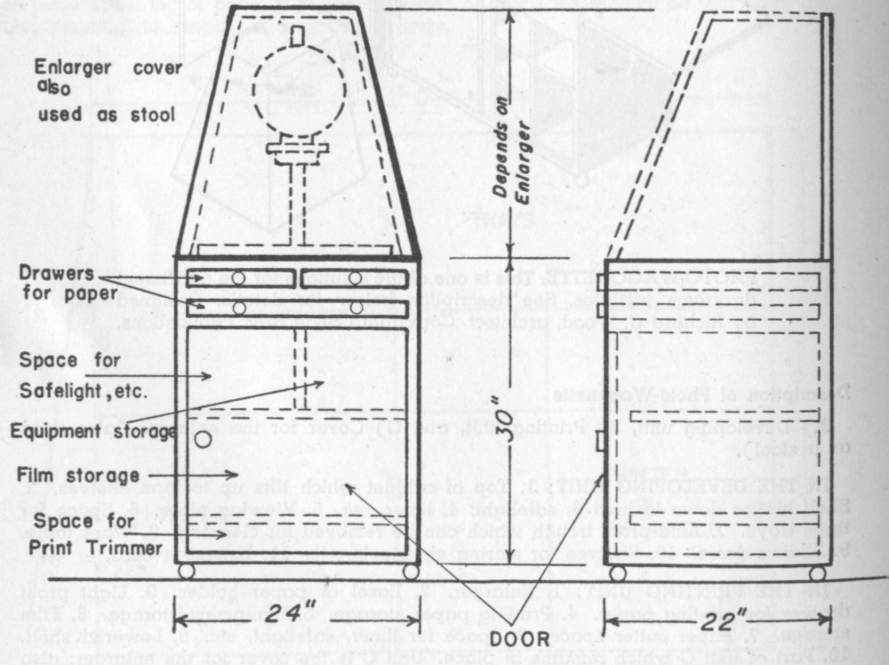
(Continued on page 15-04)

(Continued from page 15-03)

THE PHOTO-WAGONETTE (Continued)


.18"
36"
22"
Shelf for safelight, timer, etc
22"
Drop Leaf.
Acid proof pan removable for cleaning
Shelves for chemicals
30"
SLIDING DOORS

SECTION A



SECTION B AND C

PHOTO-LAB-INDEX. Copyright 1941 - Morgan & Lester

PHOTO-LAB-INDEX No. 15-M-3

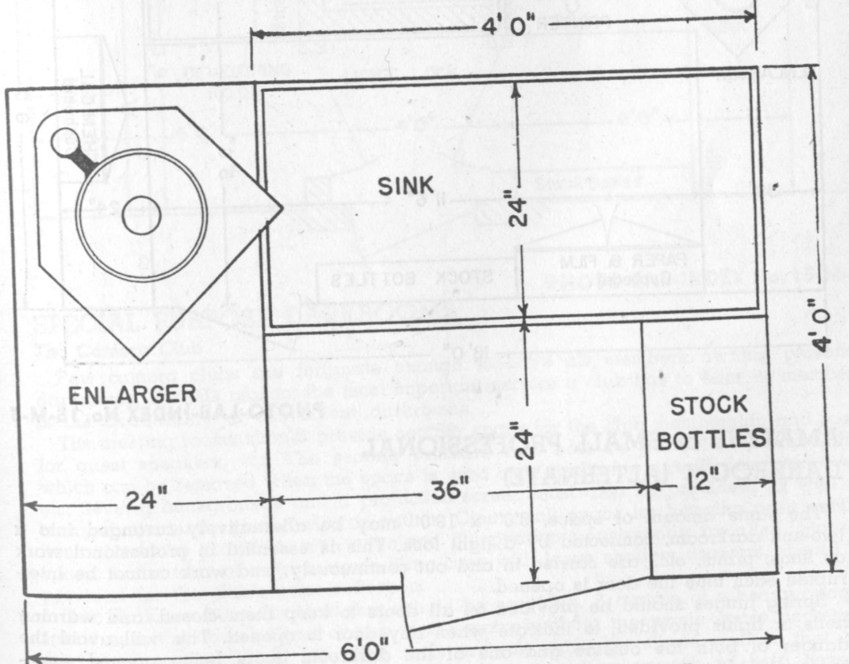
PERMANENT APARTMENT DARKROOM

Many modern apartments are equipped with so-called "dressing closets" approximately 4 x 6 feet in size. Such closets can easily be adapted to permanent darkrooms, or a darkroom of this size can be built almost anywhere in a private house.

Such a darkroom can contain a sink, with hot and cold water supply, large enough to accommodate three 11" x 14" trays. Proper arrangement of tables will take care of an enlarger and a contact printer, or two enlargers, one for large negatives and one for 35mm. Adequate shelf space should be provided for trays, paper and equipment, both above and beneath the sink, and below the enlarger table as well. Such a small darkroom can be made efficient only by means of the maximum number of shelves.

Two safelights should be provided — one positioned over the enlarger table and one over the sink. The one over the enlarger table can be dispensed with in favor of an indirect light box at the ceiling. At least one hot and two cold water taps should be supplied over the sink. The white light switch should be placed where it cannot be accidentally operated. An additional white light should be placed over the sink, and operated by a foot switch, for quick examination of finished prints in the fixing bath. The footswitch eliminates the danger of shock from fumbling for a light switch in the dark with wet hands.

Checking the mail-order house catalogs, such as Sears Roebuck, will frequently disclose kitchen fixtures which are extremely adaptable to darkroom construction. Combination sinks and cabinets, sink bases, wall cabinets fitting spaces above the sink and providing room to store paper and chemicals, are all available, frequently at lower cost than that of building such fixtures locally. Also available from the same source are linoleum table covering and stainless steel edging, to provide a neat, professional trim to a lino-covered table top.



A Darkroom in a 4' x 6' Alcove or "Dressing Room"

PHOTO-LAB-INDEX No. 15-M-4

LARGER AMATEUR DARKROOM

Where a basement or other space is available, a space 8'0" x 16'0" can be partitioned off to make the very efficient darkroom shown in this drawing. A full size sink, in which a deep hypo tray may stand permanently, and providing space as well for several large trays for enlarging, is easily accommodated. A large washing tray may be substituted for the hypo tray, or it may be supported over the hypo tray on slats, and removed when not in use. In this case, a cover should be provided for the hypo tray, to avoid dilution should the washing device overflow.

An indirect safelight should be hung in the middle of the room, and a hanging type safelight over the sink. A general white light should be provided in the center of the room, and a white inspection light, over the sink, operated by a footswitch.

For a room of this size, power ventilation is a necessity, and a small Eastman Darkroom Ventilator, or a similar unit, may be set in the wall. It is best placed high up, near the ceiling, and a light-trapped air intake provided near the floor. While the room is large enough for convenient working, it is small enough to be easily and economically cooled by one of the inexpensive air conditioning units described elsewhere in this section. Space is provided on the tables at the ends of the room for trimming, mounting, and a small table type print dryer. A negative drying cabinet may be installed below the Paper and Film Cupboard, but if heated air is used for drying, the exit vent of the cabinet should extend through the wall to avoid heating the darkroom excessively.

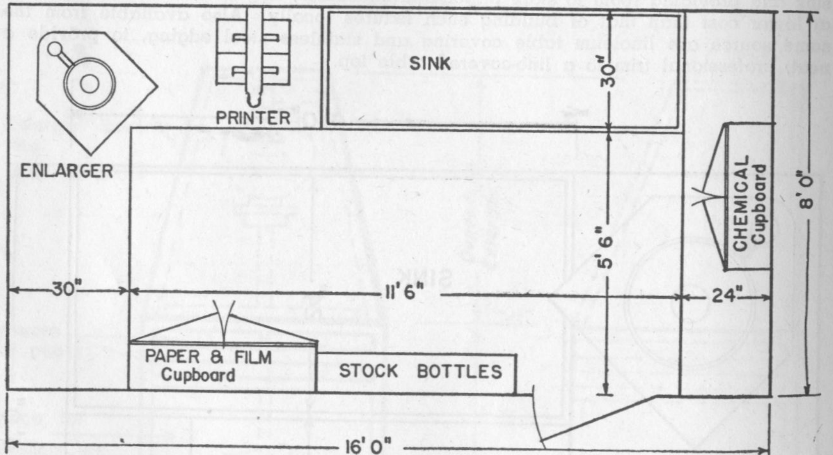


PHOTO-LAB-INDEX No. 15-M-5

AMATEUR or SMALL PROFESSIONAL DARKROOM (ALTERNATE)

The same amount of space, 8'0" x 16'0" may be alternatively arranged into a two-unit darkroom, connected by a light lock. This is essential in professional work as films, prints, etc., are carried in and out continuously, and work cannot be interrupted each time the door is opened.

Spring hinges should be provided on all doors to keep them closed, and warning bells or lights provided, to indicate when any door is opened. This will avoid the danger of both the outside and one of the darkroom doors being opened simultaneously by two people, one entering, one leaving.

(Continued on page 15-07)

(Continued from page 15-06)

The developing room is provided with a sink large enough to accommodate the developing tanks in use, and a long table on which holders are unloaded and reloaded, and developing hangers are filled. Negative drying facilities are provided, in the form of a cabinet under the table, with a warm air blower and exhaust through the wall, to keep the room cool.

The printing room is essentially the same as others, with enlarger, contact printer, and long working sink.

SAFELIGHTS— if panchromatic film is handled, it is best used in total darkness, and no safelight need be provided in the negative darkroom. If copying, and other work using slow, color blind materials is done, a hanging safelight may be provided over the sink. A white opal glass covered viewing light operated by a footswitch is also recommended over the sink. A white ceiling light should also be provided, to facilitate mixing of chemicals, and cleaning up at the end of the day.

The same recommendations follow in the printing room. One indirect safelight in the center, one hanging safelight over the sink. One large white light fixture on the ceiling, operated by a separate wall switch which cannot be confused with the safelight switches. One white inspection light, positioned over the hypo tray, operated by a foot switch.

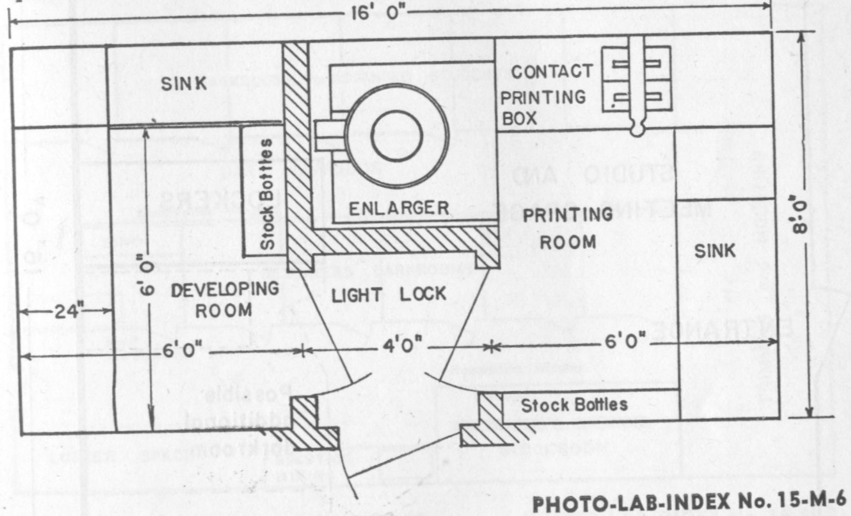


PHOTO-LAB-INDEX No. 15-M-6

SPECIAL PURPOSE DARKROOMS

The Camera Club

Few camera clubs are fortunate enough to have all members owning personal darkrooms. For this reason, the most important service a club has to offer its members is the availability of convenient darkrooms.

The meeting rooms should provide seating space for the club membership and room for guest speakers, etc. The seating facilities had best be portable folding chairs which can be removed when the space is used as a studio for portrait demonstrations, etc. Several backgrounds and a projection screen must also be provided, as well as many conveniently placed electric outlets. Clear wall space for hanging print exhibitions should be provided, with adequate illumination permanently installed. Storage space, in the form of a draftsman's filing case with large shallow drawers, should be provided for the club's print collection.

Two darkrooms are the least that should be provided. A curtain of a heavy opaque fabric over the doors allows access to the rooms without the waste space necessary for the conventional light lock. The sinks are run along the single wall so that one pipe line will handle both rooms. The sinks are large enough to hold several trays and a print washer, and, if several enlargers are available, a number of

(Continued on page 15-08)

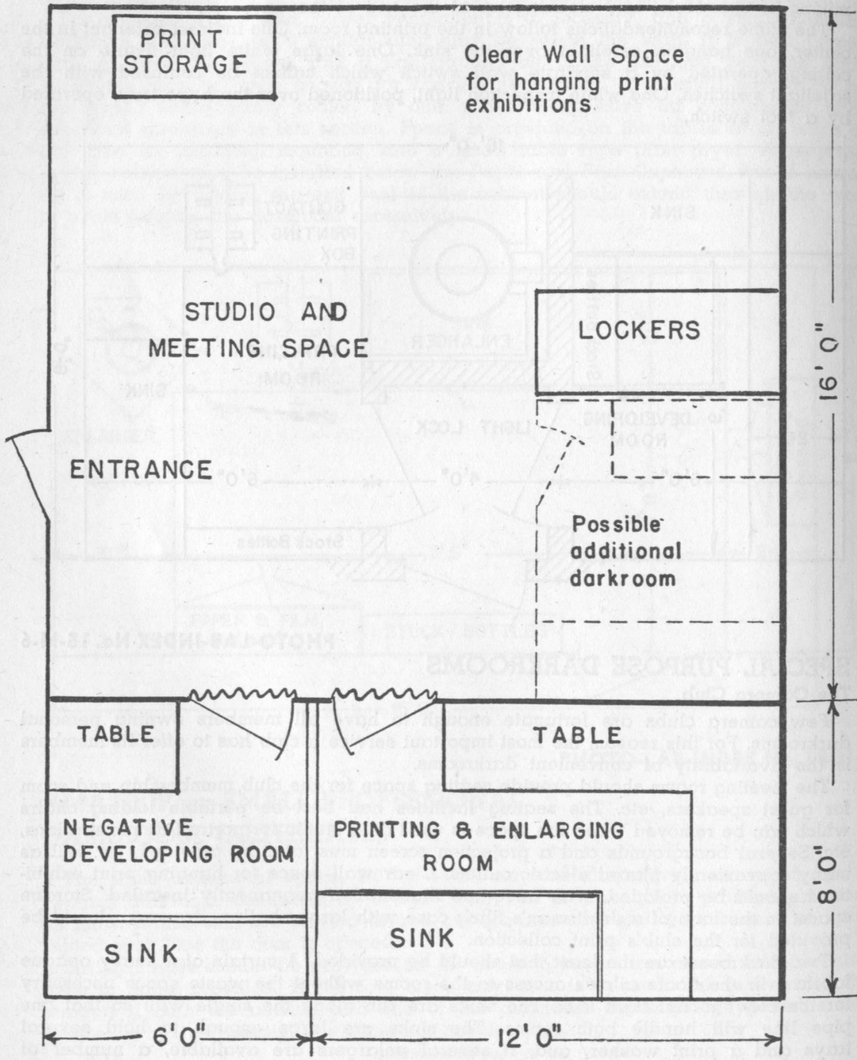
(Continued from page 15-07)

people can work in the printing room at one time. Adequate ventilation, preferably by power, is essential.

Individual lockers are essential for the storage of members' equipment. They should be large enough to take 16 x 20-inch mounts stored on edge, as well as supplies of paper, films, etc. That means that the inside dimensions of each locker should be about 17" high, 21" deep, and 12" wide.

NOTE:

This same layout, with the elimination of the possible additional darkroom, and a slightly different wall arrangement would be perfectly suitable for a small commercial or portrait studio. In this case, by removing the print lockers, etc., to the darkroom wall, a clear working space would be available for the studio, 16'0" x 18'0". The darkroom arrangement may be left as shown, or the layout shown on page 15-07 may be used.



SPECIAL PURPOSE DARKROOMS

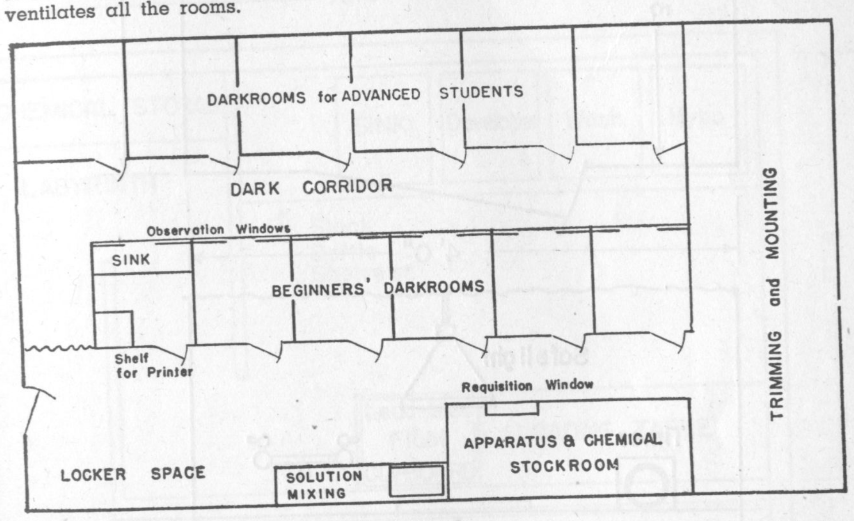
PHOTO-LAB-INDEX No. 15-M-7

The Photo School

To enable instructors to supervise the work of a number of students at once, the arrangement shown in the adjoining diagram was devised. A long dark corridor runs along a row of darkrooms, each of which has above the sink a window opening onto the corridor. The instructor can inspect each student's work through the windows without having to have light-trapped doors to each darkroom, the darkrooms need not be as large, while the windows can be closed by means of wooden blinds, latched on the inside when the student is developing high speed film, or working with white light which should not escape into the corridor. Each darkroom is equipped with sink, safelight, work table for enlarger or printer, etc. A shaded white light over the sink operated by a footswitch provides for examination of prints or negatives.

Clocks should be fastened to the wall, over the work table, and illuminated by a small safelight. The electric outlet for printer or enlarger is also located on this wall to simplify wiring. Each darkroom is on a separate fuse, so that overloads or short circuits will not interrupt work in any other room.

A double ceiling is provided, with ventilator exhaust grilles in the ceiling of each room. A large exhaust fan draws air from the space above the darkrooms, and thus ventilates all the rooms.



SPECIAL PURPOSE DARKROOMS

PHOTO-LAB-INDEX No. 15-M-8

The Dental X-Ray Room

A good, dark closet, 4 feet square, is sufficiently large for a dental processing room. The door should have an inside lock to prevent its being opened while films are being processed. Motor powered ventilation is a necessity, but a small darkroom blower will prove quite adequate, such as the Eastman Darkroom Ventilator.

The shelves and the walls to a point above the bench top and tank should be painted with a black, acid proof paint, such as Kodacoat. The upper walls should be painted Panchromatic Green, and the ceiling white. Hot and cold water should be piped into the room, with a mixing valve in the sink.

A hanging safelight is provided over the work table, while a wall type safelight, equipped with a daylight blue bulb and opal glass is fastened to the wall above the tank. This white light, operated by a footswitch, is used to examine wet, developed radiographs.

The processing tank, sunk into the table, is the special 8 x 10-inch developing outfit for dental X-rays. It consists of a water jacket surrounding the processing tanks, the jacket itself serving as a rinse and wash tank.

(Continued on page 15-10)

THE DENTAL X-RAY ROOM (Continued)

(Continued from page 15-09)

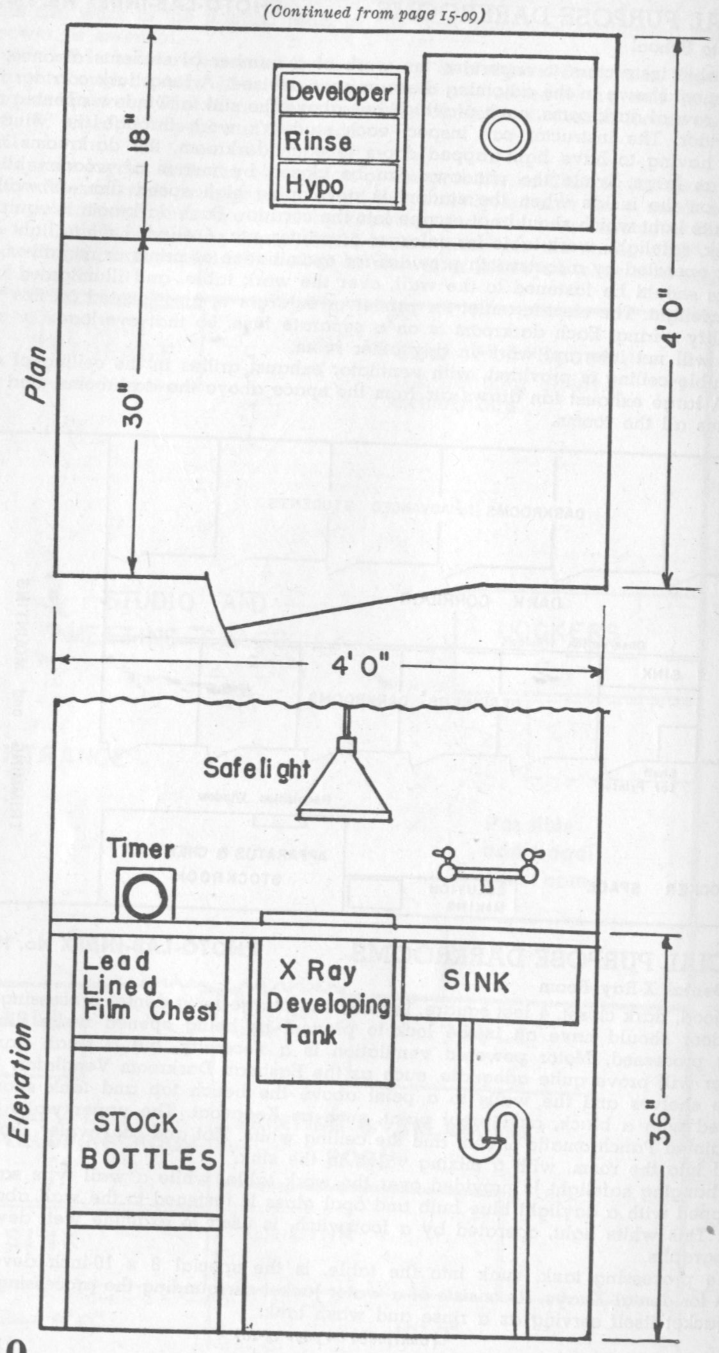


PHOTO-LAB-INDEX. Copyright 1941 - Morgan & Lester

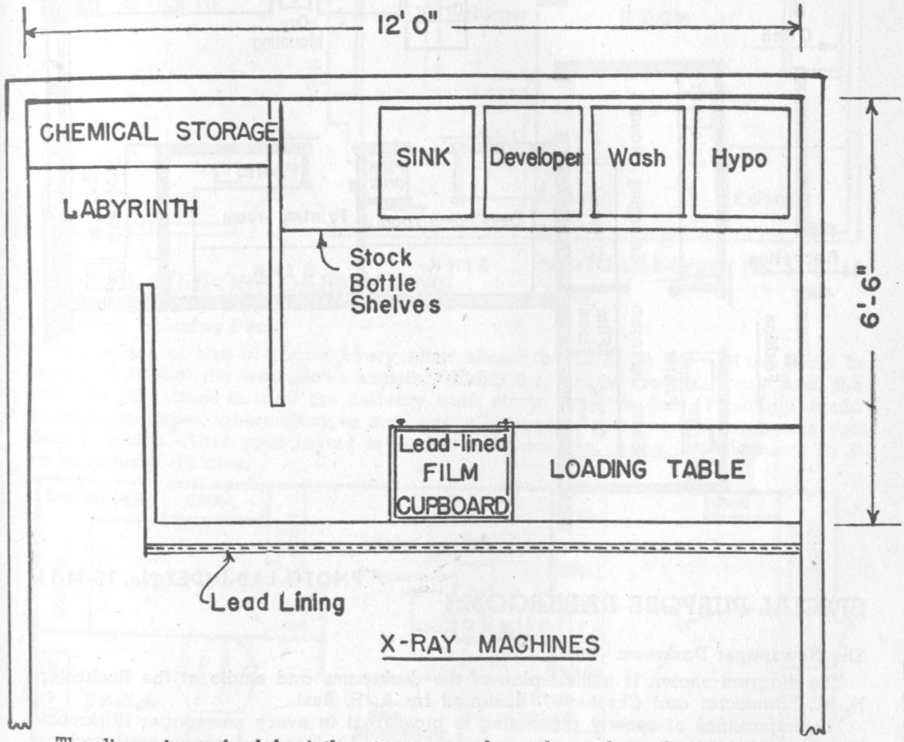
SPECIAL PURPOSE DARKROOMS

The Larger X-Ray Room

This developing room is suitable for hospital use, where larger X-ray films are in use. The essential features of any darkroom, such as safelights, sinks, tanks, etc., are present. Due to the fact that X-ray radiation can fog film at great distances, the wall of this darkroom facing the X-ray room proper is lined with lead sheet for protection of the workers within. Films are stored in the lead lined cupboard indicated. Hanging safelights should be provided over the loading table and over the sinks.

On the loading side of the room, there should be facilities for keeping developing hangers, and storing cassettes, exposure holders, and the film supply. A film transferring cabinet, extending from the loading bench, through the wall into the exposure room is a decided convenience. The cabinet should be provided with a rod having a right angled lug at each end to prevent one door from being opened unless the opposite side is properly closed.

The usual footswitch operated white light for film inspection should be positioned over the washing tank. A drying cabinet, with blower and heater, arranged so that it exhausts outside the room, will provide quick drying and aid in room ventilation as well.



The dimensions of a labyrinth entrance, as shown here, depend on local conditions. The shifting of a light fixture in the room outside, a few feet to one side of the entrance to the darkroom, will frequently eliminate the need for more than a shallow light trap. On the other hand, should there be a window directly opposite the entrance to this light lock, it may be necessary to put on both inside and outside doors. In any case, the interior of the labyrinth should be painted a non-reflecting black. The general rules for designing a light lock of this type are: Total depth equals three times the width of each passage. Center partition equals twice the width of each passage. This, it will be seen, makes all openings equal in width to the passage width.

PHOTO-LAB-INDEX No. 15-M-10

SPECIAL PURPOSE DARKROOMS

The Publication Darkroom

The layout shown here is that of "Vogue" Studios, of Condé Nast Publications, located in Grand Central Palace, New York City, N. Y., designed by Richard Carver Wood.

This photo-laboratory was planned for the specialized problems of a large, "slick paper" magazine, which demands speed combined with optimum quality. These organizations realize that speed and quality can be secured only by skilled workers provided with excellent mechanical equipment and carefully planned quarters.

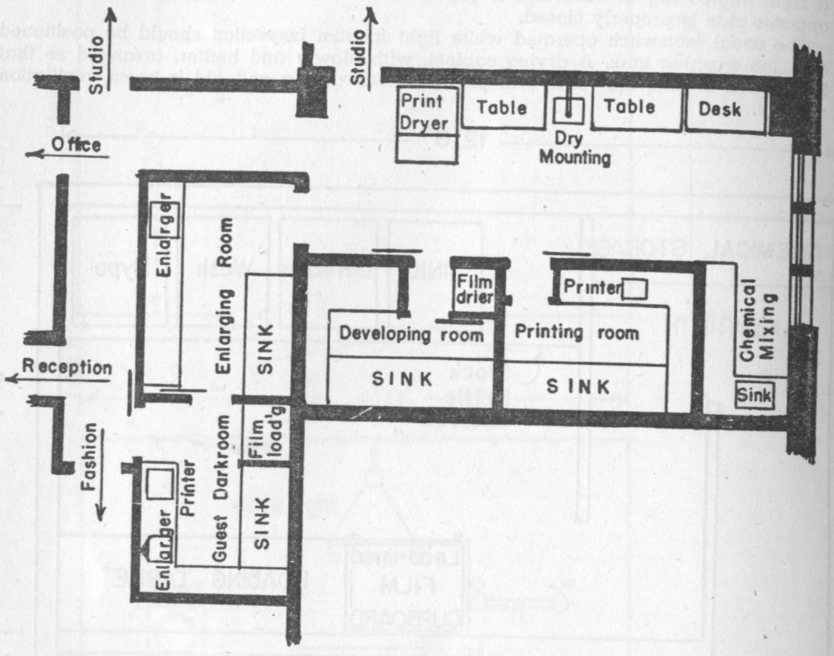


PHOTO-LAB-INDEX No. 15-M-11

SPECIAL PURPOSE DARKROOMS

The Newspaper Darkroom

The diagram shown is a floor plan of the darkrooms and studio at the Rochester, N. Y., "Democrat and Chronicle," designed by A. S. Best.

The importance of speedy processing is proverbial in every newspaper darkroom. The four most important factors to consider are: (1) Plenty of convenient working space; (2) efficient layout of equipment and processing rooms; (3) good modern equipment, and (4) ventilation.

The layout shown provides three individual developing rooms, all opening into one large printing room, which in turn is equipped with three enlargers of various sizes, and a long sink for developing the prints. A separate room is provided with deep tanks for development of roll film and 35mm miniature camera films.

Ventilation in this case is taken care of by a central fan system with ducts to all workrooms, removing stale air, and separate ducts bringing in fresh air.

(Continued on page 15-13)

(Continued from page 15-12)

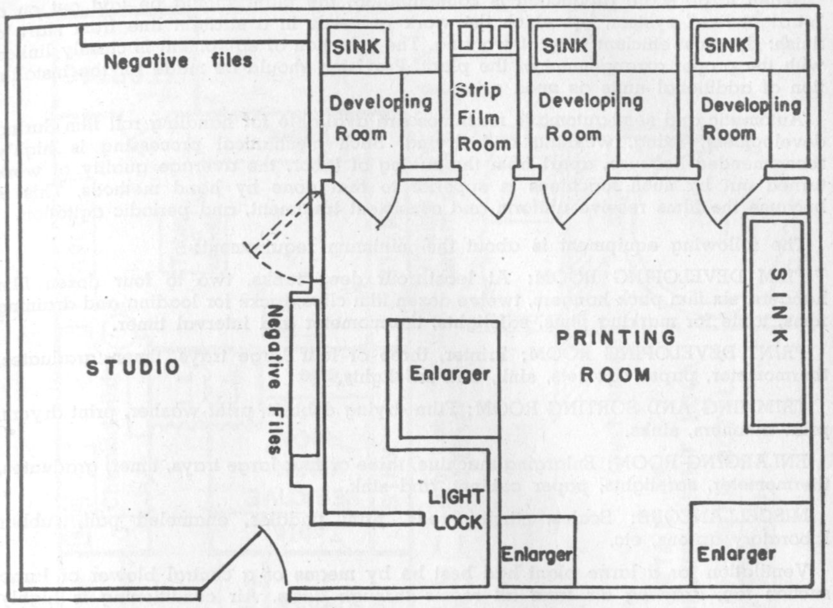
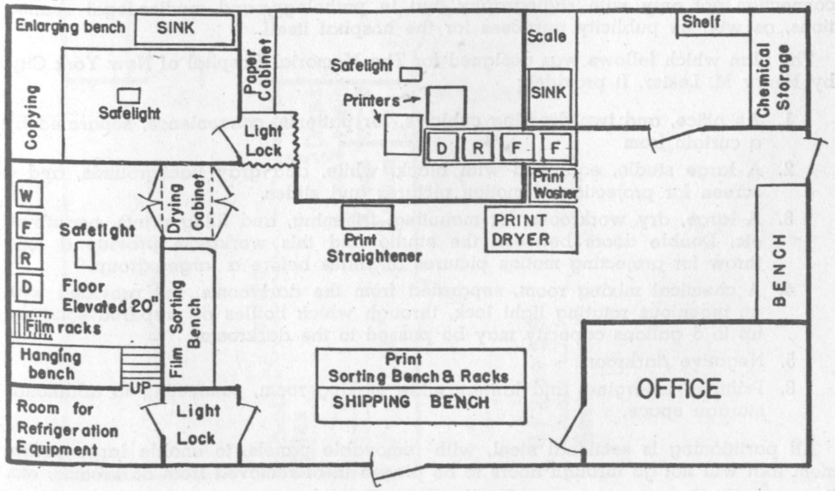


PHOTO-LAB-INDEX No. 15-M-12

SPECIAL PURPOSE DARKROOMS

The Photo Finishing Plant

Regardless of size or shape, every effort should be made to lay out the plant in such a way that the work flows smoothly along the shortest possible route from the time the rolls come in until the delivery truck starts from the door. Planning should be done on paper, where changes may easily be made. Try several plans before you finally decide. After your layout is settled and working, make improvements in it as experience dictates.



(Continued on page 15-14)

(Continued from page 15-13)

When large scale production is contemplated, the plant should be laid out on a "straight line" system, by which the work proceeds in a straight line from start to finish; the most efficient way of working. The selection of equipment is closely linked with the proper arrangement of the plant. Provision should be made for the installation of additional units as need arises.

Automatic and semi-automatic machines are available for handling roll film during development, fixing, washing and drying. Such mechanical processing is highly recommended because, apart from the saving of labor, the average quality of work turned out by such machines is superior to that done by hand methods. This is because the films receive uniform and consistent treatment, and periodic agitation.

The following equipment is about the minimum requirement:

FILM DEVELOPING ROOM: At least four deep tanks, two to four dozen film hangers, six film pack hangers, twelve dozen film clips, racks for loading and draining films, table for marking films, safelights, thermometer and interval timer.

PRINT DEVELOPING ROOM: Printer, three or four large trays, timer, graduates, thermometer, paper cabinets, sink, and safelights.

TRIMMING AND SORTING ROOM: Film drying cabinet, print washer, print dryers, print trimmers, sinks.

ENLARGING ROOM: Enlarging machine, three or four large trays, timer, graduates, thermometer, safelights, paper cabinet, and sink.

MISCELLANEOUS: Scales, stirring rods, print paddles, enameled pail, rubber laboratory aprons, etc.

Ventilation for a large plant had best be by means of a central blower or large suction fan, drawing air from all rooms through ducts. Air conditioning is highly advantageous, especially since peak load is in midsummer, when working conditions are most difficult.

PHOTO-LAB-INDEX No. 15-M-13

SPECIAL PURPOSE DARKROOMS

The Hospital Department of Photography

Photography is coming into increasingly greater prominence for hospital use, in connection not only with radiography, but in pathology, and medico-legal connections, as well as publicity purposes for the hospital itself.

The plan which follows was designed for The Memorial Hospital of New York City, by Henry M. Lester. It provides:

1. An office, and two dressing cubicles, for patients' convenience, separated by a curtain from
2. A large studio, equipped with black, white, and gray backgrounds, and a screen for projection of motion pictures and slides.
3. A large, dry workroom, for mounting, trimming, and filing prints, negatives, etc. Double doors between the studio and this workroom provide a long throw for projecting motion pictures or slides before a larger group.
4. A chemical mixing room, separated from the darkrooms, but provided with an ingenious rotating light lock, through which bottles of prepared solutions up to 5 gallons capacity may be passed to the darkroom.
5. Negative darkroom.
6. Printing, enlarging, and lantern slide making room, connecting to additional storage space.

All partitioning is sectional steel, with removable panels, to enable large equipment that will not go through doors to be placed in or removed from darkrooms, etc.

(Continued on page 15-15)

(Continued from page 15-14)

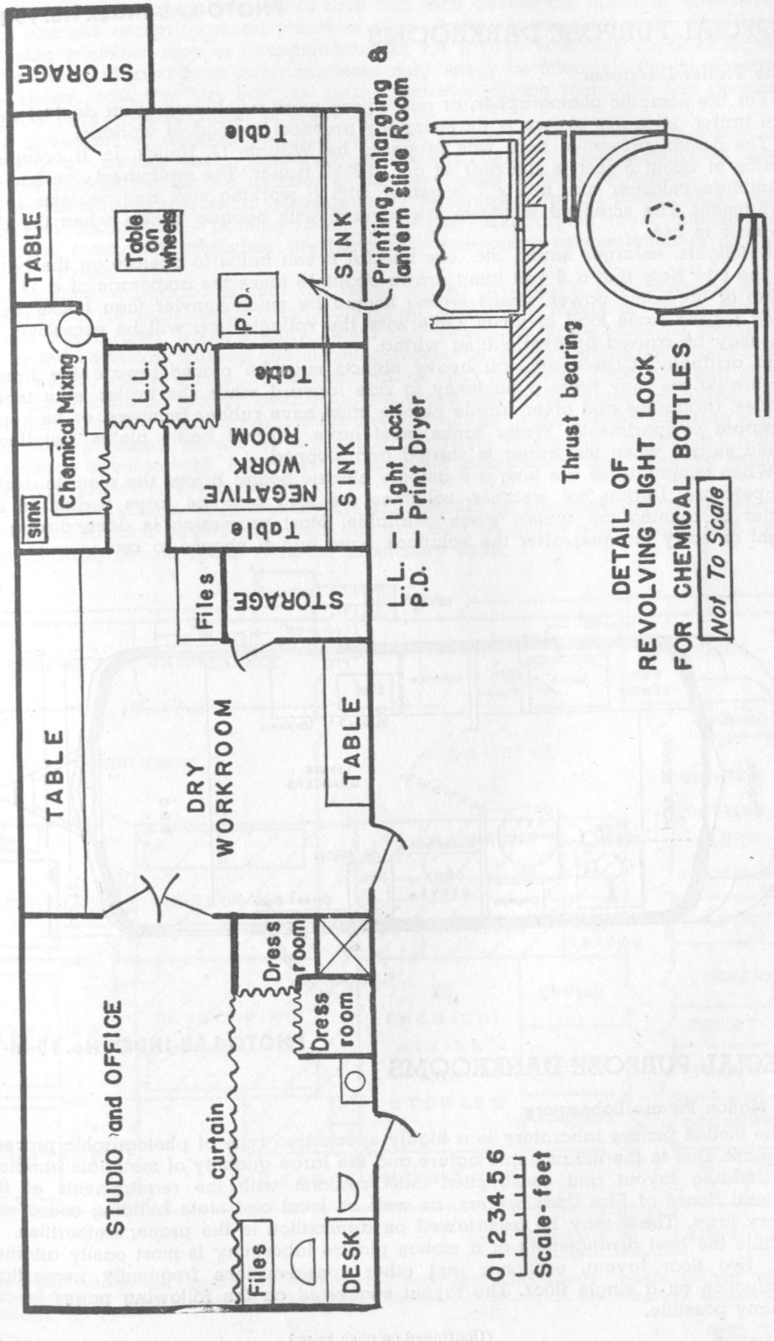


PHOTO-LAB-INDEX No. 15-M-14

SPECIAL PURPOSE DARKROOMS

The Trailer Darkroom

For the nomadic photographer, or one whose work involves a great deal of travel, the trailer darkroom shown is an eminently practical method of working.

The design presented here was prepared by William G. Houck, Jr. It occupies a space of about 5 feet in the rear of an 18'8¾" trailer. The equipment consists of a miniature enlarger and a 5 x 7, together with a working sink and cabinets for all equipment. The screened windows are covered with opaque panels when the darkroom is in use.

Safelights, enlarger lamps, etc., are special 6 volt bulbs to operate on the battery of the car. Note that a 6 volt lamp draws about 19 times the amperage of a 115 volt lamp of the same power, hence wiring should be much heavier than house wiring used for the same load *in watts.* Otherwise the voltage drop will be excessive, and fire may be caused by overloading wiring.

In arranging closets, etc., all heavy objects must be placed toward the front of the trailer, as they have a tendency to ride forward while the trailer is in motion. Bottles, graduates and other fragile objects must have rubber bumpers, or be kept in separate compartments. Water tanks must have internal baffle plates installed to avoid surges when the trailer is started and stopped.

When temperatures are low, a 9 ampere electric heater brings the room to desired temperature. During hot weather, solutions are iced and the trays floated in cool water or running tap water, when available. Most processing is done during the night or early morning after the solutions have had a chance to cool.

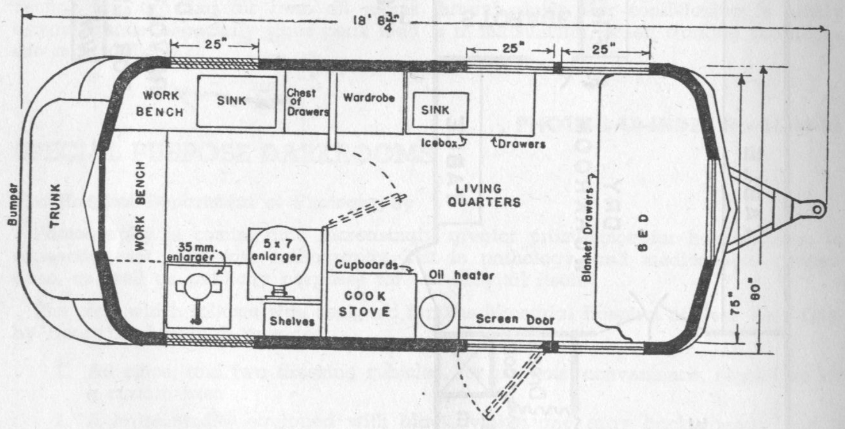


PHOTO-LAB-INDEX No. 15-M-15

SPECIAL PURPOSE DARKROOMS

The Motion Picture Laboratory

The motion picture laboratory is a highly specialized type of photographic processing plant. Due to the inflammable nature and the large quantity of materials handled, the building layout and construction must conform with the requirements of the National Board of Fire Underwriters, as well as local and state building codes and factory laws. These may be ascertained on application to the proper authorities.

While the best arrangement of a motion picture laboratory is most easily attained in a two floor layout, economic and other considerations frequently necessitate construction on a single floor. The layout suggested on the following pages is one of many possible.

(Continued on page 15-17)

(Continued from page 15-16)

This layout is based on the use of rack and tank developing methods, now more or less obsolete except for small plants or those doing experimental work. However, developing machines may be accommodated in this layout, with only minor changes. The "wet end" of most developing machines may easily be fitted into the developing rooms shown, with the "dry box" set in the indicated drying room, the film passing through a light trapped tunnel in the wall.

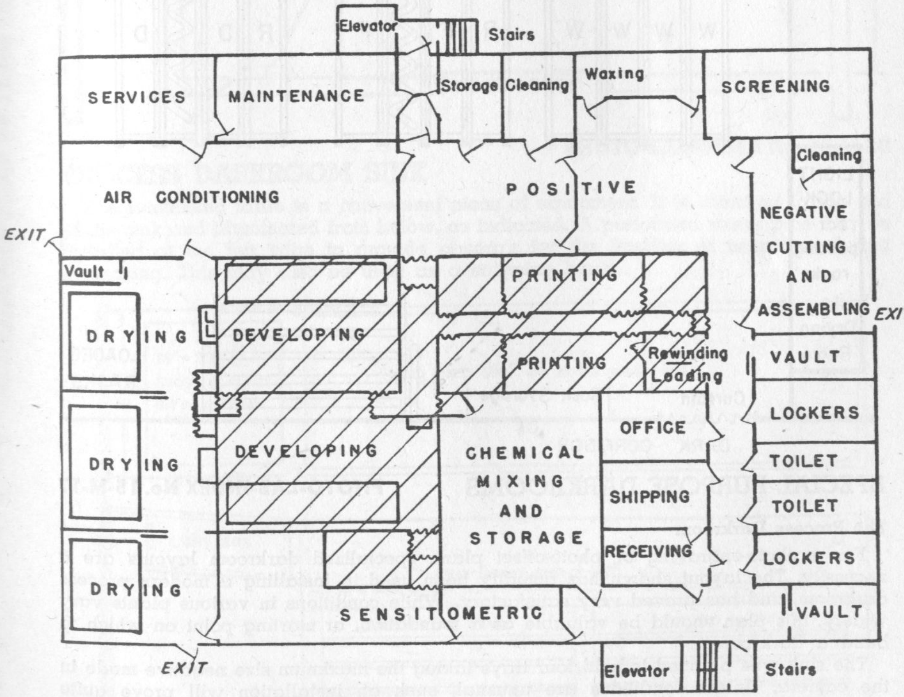
The movement of undeveloped film between printing and developing rooms is facilitated by having them connected, as shown, by dark passages; thus less elaborate packing of film for transfer to the developing room is necessary.

Vaults should be provided in excess of total requirements at all points where film is likely to accumulate — printing room, processing room, drying room, cutting and assembling room. This minimizes fire hazard by preventing accumulation of film in open workrooms.

The location of darkrooms near the center of the building is advantageous from the standpoint of light locking and connection with other rooms in which film is handled. Rooms from which vapors, fumes and poisonous gases must be removed, such as the chemical, waxing and cleaning rooms, as well as projection rooms and storage vaults, should be on the outside wall of such buildings. Receiving and shipping rooms should be located near exits, yet convenient to film handling rooms.

Ventilation, with or without air conditioning, should be of the positive pressure type. The highest pressures should be maintained in rooms where film is handled. Thus any leakage flows toward, not from, the chemical, maintenance and shipping rooms, toward the outside of the building.

A reasonable number of emergency fire exits should be provided. Darkrooms where film is handled should have more than one exit, and the paths leading from any part of the building should reach different laboratory exits.



This information and layout as well as the rack and tank layout which follows were condensed from "Motion Picture Laboratory Practice," courtesy of the Eastman Kodak Co., Rochester, N. Y.

SPECIAL PURPOSE DARKROOMS

PHOTO-LAB-INDEX No. 15-M-16

The Rack and Tank Developing Room For Motion Picture Films

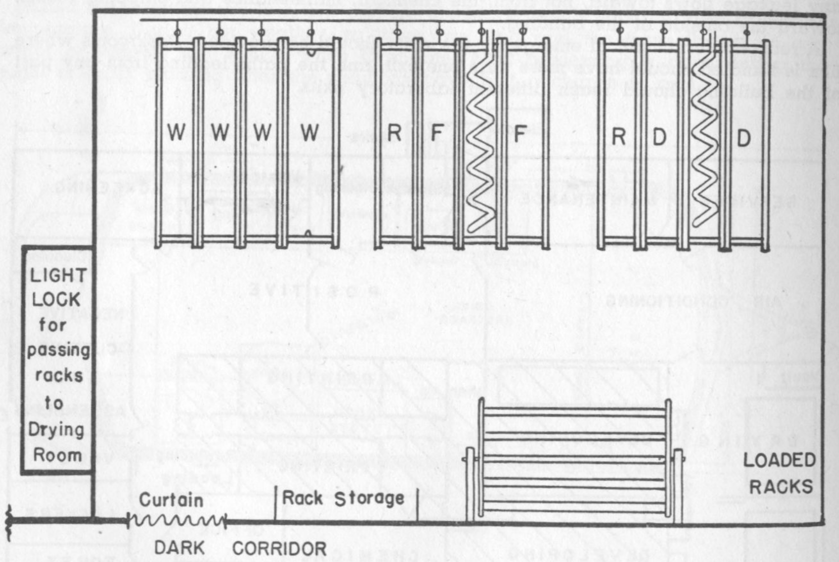
While the rack and tank method of film developing is obsolete for production purposes, many small laboratories, title studios, and experimental plants find it still useful. For this reason we show herewith a small but practical rack and tank plant.

The tanks are made up in units of four. Two developer and rinse tanks are combined in the first unit. One rinse compartment, between two of the developer tanks, is used only as a cooling unit — the water in this tank serving to transfer heat from the developer tanks to the cooling coil submerged in the center tank. A similar means of cooling is provided for the hypo tanks.

A short light locked passage is provided so that racks of developed and washed film may be transferred to the drying room and empty racks returned to the darkroom.

The tanks are supported at each end on concrete supports running parallel to the length of the room. The entire floor is covered with mastic, and a curb is fitted around the tanks with a central drain to take care of the overflow. The mastic will not withstand the weight of the tanks, but the tops of the supports can be waterproofed with sheet lead caps which have aprons extending well down over the mastic, which is brought up the sides.

A slatted platform is placed around the tanks and covering the remainder of the floor space, at such a height as to place the tops of the tanks at waist level.



SPECIAL PURPOSE DARKROOMS

PHOTO-LAB-INDEX No. 15-M-17

The Process Darkroom

For a photo-engraving or photo-offset plant, specialized darkroom layouts are a necessity. The layout shown has actually been used in installing a modern process darkroom, and has proved very satisfactory. While conditions in various plants vary widely, this plan should be valuable as a foundation, or starting point on which to build a darkroom.

The sink was planned to hold four trays taking the maximum size negative made in the camera. Unless conditions are unusual, such an installation will prove quite adequate. The space under the sink serves as a convenient storage space for trays not in use.

(Continued on page 15-19)

(Continued from page 15-18)

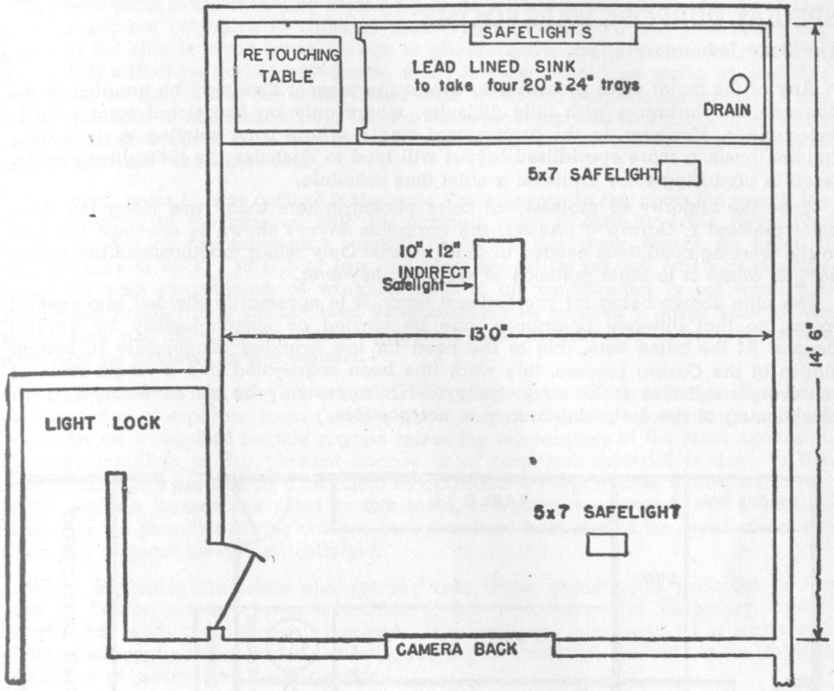
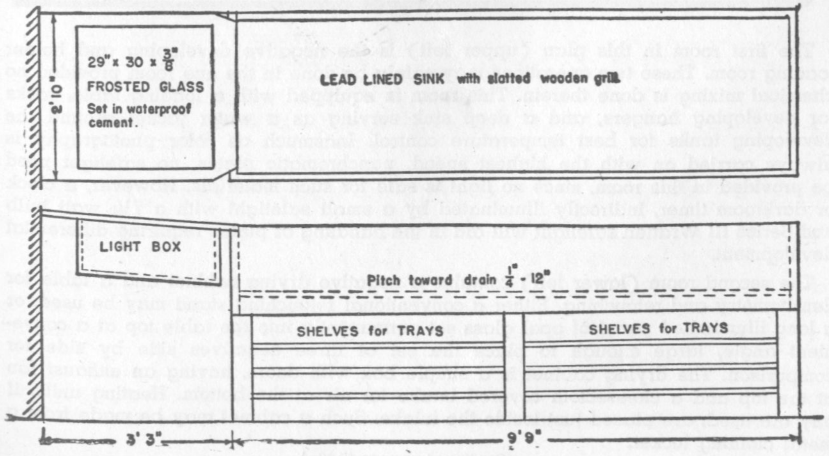


PHOTO-LAB-INDEX No. 15-M-18

PROCESS DARKROOM SINK

The retouching table is a convenient piece of equipment. It is attached to the end of the sink and illuminated from below, as indicated. A perforated water pipe may be installed at the left edge to provide a spray for the flushing of negatives during retouching. This may also be used as a stripping bench.


2'10"
29" x 30 x 3/8"
FROSTED GLASS
Set in waterproof cement.
LEAD LINED SINK with slatted wooden grill
LIGHT BOX
Pitch toward drain 1/4" - 12"
SHELVES for TRAYS
SHELVES for TRAYS
3' 3"
9'9"

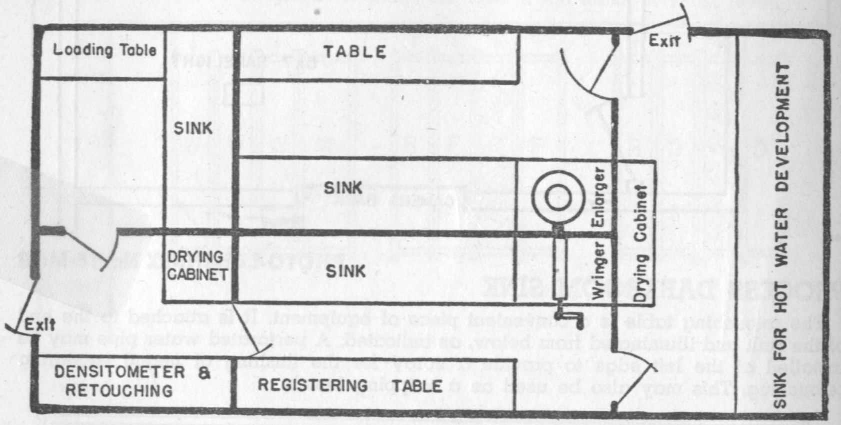
SPECIAL PURPOSE DARKROOMS

The Color Laboratory

Any of the major color processes in use at the present time may be handled in the conventional darkroom with little difficulty, where only an occasional color print is being made. However, in the professional studio, where color printing is done on a fulltime basis, a more specialized layout will tend to minimize the difficulties encountered in producing color prints on a strict time schedule.

Since the majority of professional color photographers today are using the three color pigment ("Carbro") process, the darkroom layout shown is one best adapted to the working conditions needed in that process. Only minor modifications are necessary to adapt it to other methods of working, however.

The plan shown being for professional work, it is necessarily divided into several rooms, so that different operations may be carried on simultaneously by several people. At the same time, due to the need for low working temperature in certain stages of the Carbro process, this work has been segregated into a single room of relatively small size which may easily and inexpensively be air conditioned, if air conditioning of the entire laboratory is not possible.



The first room in this plan (upper left) is the negative developing and holder loading room. These two operations may safely be done in the one room provided no chemical mixing is done therein. This room is equipped with a loading table, racks for developing hangers, and a deep sink serving as a water jacket around the developing tanks for best temperature control. Inasmuch as color photography is always carried on with the highest speed, panchromatic plates, no safelight need be provided in this room, since no light is safe for such materials. However, a clock or darkroom timer, indirectly illuminated by a small safelight with a 7½ watt bulb and Series III Wratten safelight will aid in the handling of plates requiring differential development.

The second room (lower left) contains a negative drying cabinet and a table for densitometry and retouching. Either a conventional retouching stand may be used, or a long illuminated panel of opal glass set permanently into the table top at a convenient angle, large enough to place the set of three negatives side by side for comparison. The drying cabinet is a simple box with doors, having an *exhaust* fan at the top and a cheesecloth covered intake for air at the bottom. Heating units, if any are used, are placed just inside the intake. Such a cabinet may be made from a metal clothing locker.

(Continued on page 15-20a)

(Continued from page 15-20)

The third room is the enlarging room (top center). This is entirely conventional and may be laid out according to personal taste. The layout shown is quite satisfactory provided the sink is made large enough to accommodate the largest trays needed—at least 16 x 20 trays for 14 x 17 prints, etc. Provision should be made to plug the sink drain so that it may be partly filled with water for temperature control of the trays. The table in this room should have a waterproof top and a white or fluorescent light installation above it so that sets of three prints may be laid out for inspection and comparison while still wet.

The fourth room (lower center) is the main Carbro room. In this room the sensitizing and combining of the pigment with the bromide print is done and the registering of the images on the temporary support. Since all this work should be done at temperatures of 65°F. (18°C.) or less, the room should be kept as small as possible consistent with convenience of working. Thus if air conditioning is not available, emergency cooling may be obtained in midsummer by placing a large cake of ice in the sink and blowing an electric fan over it. A surprisingly large temperature drop may be obtained in this manner.

For the same reason the hot water development of the Carbro images has been segregated in a separate room (right), since the running of as large a quantity of hot water as is required for this process raises the temperature of the room markedly. Since no handling of dry pigment images or of sensitized material is done in this room, it may also be used as a chemical mixing room without danger of contamination. If the pigment images are dried in this room, however, a cabinet should be made similar to the negative drying cabinet except that no heat should be supplied for the drying of pigment images on celluloid.

While for black and white photography cold water plumbing is sufficient, in the case of Carbro printing large quantities of hot water are also necessary. Before constructing such a laboratory, therefore, it is well to be assured of a large and continuous supply of hot water (at least 120°F.) or provision for heating the copious quantities of water which are required.

One other interesting feature of this particular layout is that three of the sinks are bunched around one partition, which makes for simple plumbing. Two emergency exits are shown, but may of course be placed anywhere depending on the exigencies of the situation.

DARKROOM DETAILS

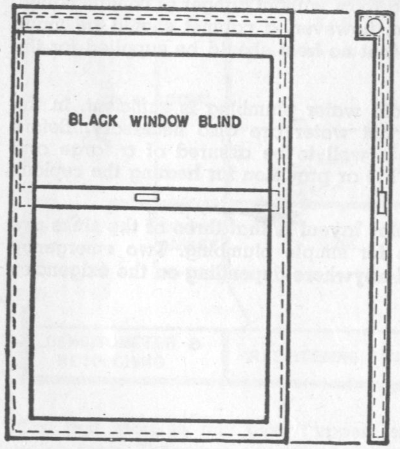
In planning an individual darkroom, there are a number of details held in common by all photo laboratories, no matter how small or large. Some suggested ways of handling these details are shown here.

PHOTO-LAB-INDEX No. 15-M-18b

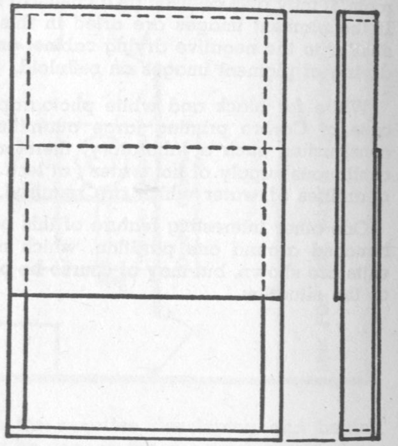
DARKROOM DETAILS

Blocking Up Windows

The simplest method of darkening windows for a permanent darkroom is simply to paint the window panes with opaque paint. Several coats of black paint, followed by one or two of a lighter color to harmonize with the interior trim of the darkroom will usually suffice. An equally efficient method is to cover each pane with a carefully fitted piece of black cardboard or black paper. The crack around the edges is sealed with black Scotch tape. This means has the advantage of quick and easy removal if necessary for any reason.



TEMPORARY WINDOW COVER



PERMANENT WINDOW COVER

Both of these methods are for permanent darkening of windows. Where a room is used as a darkroom only part of the time, a simple means of darkening is shown in the figure to the left. This consists of a light wood frame, the size of the outside of the window casing. Running inside this frame is an opaque window blind. The frame itself is made an easy running fit for the blind, and overlaps it on all sides by at least 4 inches. The inside of the groove in which the blind runs is painted black to avoid light reflections around the edges of the blind. The whole affair may be permanently screwed to the window frame and if painted to harmonize with the room trim, will be practically unnoticeable with the blind raised; an interesting feature for the photographer who must make the kitchen or bathroom serve as a part time darkroom.

(Continued on page 15-20c)

(Continued from page 15-20b)

A similar framed blind is sold for "blackout" purposes by various large window blind makers, who have been supplying such framed window blinds for many years. They are identical to the lightproof blinds intended for darkening school lecture rooms for stereopticon and microscopic projection. Window shades used this way, however, should be carefully checked against a strong light to make sure they are completely opaque. Pinholes and cracks will make shades useless for photographic darkroom purposes, though they may not interfere with darkening a room for projection of motion pictures or slides.

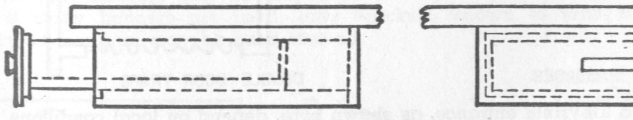
A permanent method of darkening windows is shown at the right. This is nothing more than a shallow box, made of plywood and painted with weatherproof paint on the outside—black on the inside to prevent light reflections. This entire box is then fastened to the outside of the window, thus permitting the window to be opened from the inside for ventilation without admitting any light. Or, if the window is accessible from outside—from a fire-escape for example—the box may be attached to the inside of the window. In warmer climates, the window may be removed altogether and replaced by such a box which is thus left permanently open.

PHOTO-LAB-INDEX No. 15-M-18c

DARKROOM DETAILS

Light-Tight Paper Drawer

When large quantities of work are being done with several different grades of paper, it becomes very inconvenient to open and close the various packages of paper in use. In addition there is always the danger of leaving a package open and turning on a white inspection light to examine a print. A light tight drawer, in which unwrapped paper may be placed, is a great convenience in such cases. For maximum utility, it should be placed as near to the enlarger as possible.



Side View *Front View*

LIGHT - TIGHT DRAWER

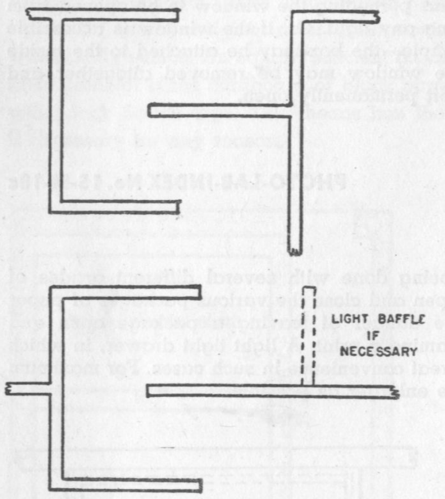
Such a drawer may be constructed as shown in the drawing. A light tight box is fastened to the underside of the table top. A well fitting drawer is made to slide in this box. The front of the box is rabbeted to fit the stepped front of the drawer, which is thus completely light tight when closed. The drawer may be made large enough to hold several packages of paper side by side, or for smaller quantities of large paper, several slanting compartments may be provided. Such compartments are sold in most stationery stores for keeping letterheads, carbon paper, second sheets, etc., in desk drawers.

It is essential that a lock be provided for this drawer, to avoid the danger of its being accidentally opened in white light in search of tools, pencils, etc.

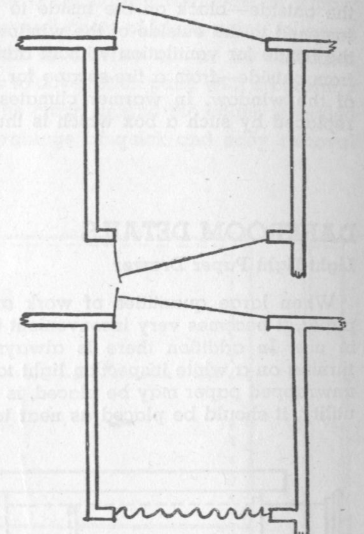
PHOTO-LAB-INDEX No. 15-M-19

ENTRIES AND EXITS

Where workers must be free to leave or enter darkrooms, without disturbing processing operations going on within, some sort of light trapped entrance is indicated. This may be merely a passage, in the form of a maze, painted black inside to minimize light reflection around corners. Where space is limited, the double door trap is preferred, as only sufficient space is needed within to permit full opening of the door, while if doors swing outward, even less space is required. Some means—a warning buzzer wired to burglar alarm switches in both doors—should be provided to prevent accidental opening of both doors at once.



LIGHT TRAPPED PASSAGES


DOUBLE DOOR TRAPS

The dimensions of a labyrinth entrance, as shown here, depend on local conditions. The shifting of a light fixture in the room outside, a few feet to one side of the entrance to the darkroom, will frequently eliminate the need for more than a shallow light trap. On the other hand, should there be a window directly opposite the entrance to this light lock, it may be necessary to put on both inside and outside doors. In any case, the interior of the labyrinth should be painted a non-reflecting black. The general rules for designing a light lock of this type are: Total depth equals three times the width of each passage. Center partition equals twice the width of each passage. This, it will be seen, makes all openings equal in width to the passage width.

PHOTO-LAB-INDEX No. 15-M-20

SINKS AND PLUMBING

Developing operations on both films and papers are best carried on in a long sink, big enough to accommodate three of the largest trays to be used. Such a sink may be made of cypress, with watertight joints, as shown in the succeeding illustration. This joint is made by rabbeting both edges of the bottom planks and inserting a slip of white pine tightly in the groove thus formed. When wet, this strip will swell and make a watertight joint. Many local tank makers, specializing in wooden chemical tanks, can make these sinks at very reasonable cost. Or the sink may be constructed of any kind of lumber, and lined with sheet lead or stainless steel. A less expensive lining can be made of galvanized iron, painted with red lead and several coats of acid proof paint such as Probus, Kodacoat or asphaltum.

(Continued on page 15-21)

(Continued from page 15-20)

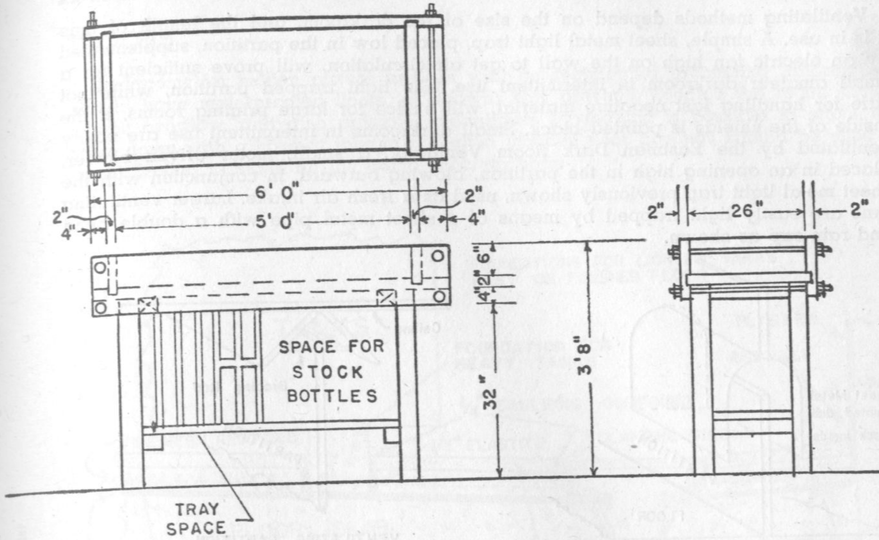
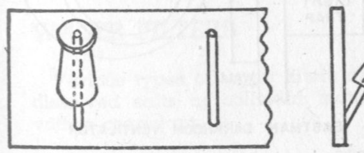
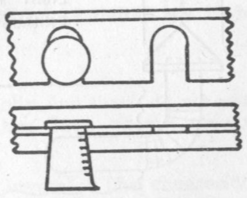


PHOTO-LAB-INDEX No. 15-M-21

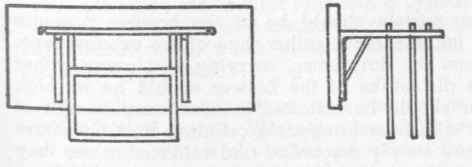
STORING GRADUATES AND HANGERS

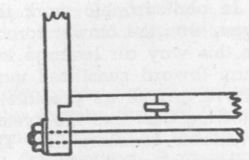
Convenient storage of graduates and developing hangers is a minor problem, easily solved. Graduates may be hung from a slotted shelf, or on a peg board, as shown. Developing hangers may be suspended between a pair of ordinary shelf brackets, or if many hangers are used, long brackets, known to farm supply dealers as harness hangers, may be used instead.


PEG BOARD


GRADUATE RACK

METHODS of STORING GRADUATES

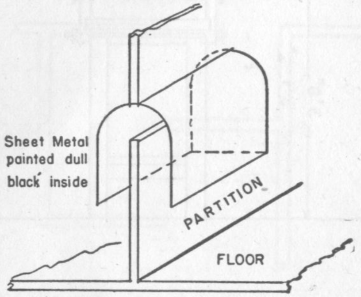

DEVELOPING HANGER RACK


WATER-TIGHT JOINT FOR WOODEN SINKS.

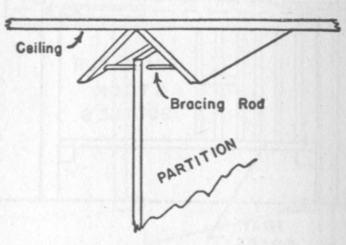
VENTILATION

PHOTO-LAB-INDEX No. 15-M-22

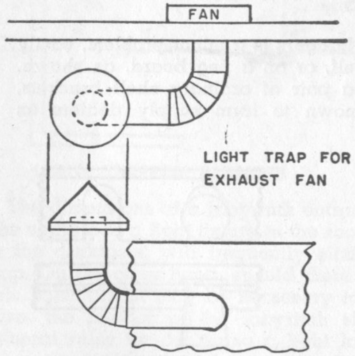
Ventilating methods depend on the size of the darkroom, and the length of time it is in use. A simple, sheet metal light trap, placed low in the partition, supplemented by an electric fan high on the wall to get air circulation, will prove sufficient for a small amateur darkroom in intermittent use. The light trapped partition, while not safe for handling fast negative material, will suffice for large printing rooms, if the inside of the shields is painted black. Small darkrooms in intermittent use are easily ventilated by the Eastman Dark Room Ventilator, a small, motor driven blower, placed in an opening high in the partition, blowing outward, in conjunction with the sheet metal light trap previously shown, used as a fresh air intake. Larger ventilating fans are easily light trapped by means of a sheet metal pipe with a double bend and rain cap as shown.



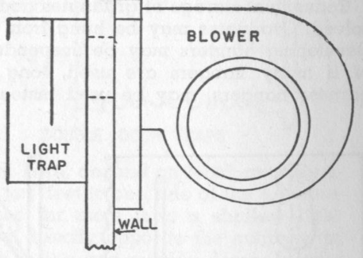
SECTION THROUGH LIGHT TRAPPED AIR INTAKE



VENTILATING PARTITION



LIGHT TRAP FOR EXHAUST FAN



EASTMAN DARKROOM VENTILATOR

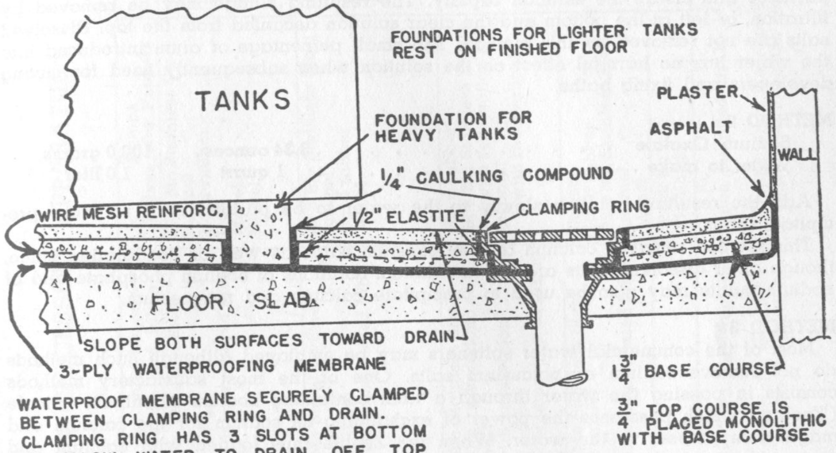
Larger installations, comprising several rooms, are best ventilated by means of a central blower system, connected by ducts to the various rooms. Such work should be done by a competent contractor experienced in ventilating work, since improperly made bends or too many of them in a ventilating duct can drastically reduce the efficiency of the system.

In photographic work the ventilating system should be of the positive pressure type, with the blower forcing fresh air into the room, rather than of the exhaust type. In this way air leakage is outward from the darkrooms, carrying dust away rather than toward sensitized materials. The air intake of the blower should be as high above ground as possible, and a filter should be installed to avoid any danger of blowing dust into the system. Blowers with interchangeable cellulose dust filters are available commercially. These filters are simply discarded and replaced when they become clogged with dust, obviating the necessity of a messy cleaning job. Since they are very inexpensive, they may be changed whenever they become so full of dust that the blower has difficulty in pulling air through the filter unit.

PHOTO-LAB-INDEX No. 15-M-23

FLOORS

Darkrooms for motion picture use, as well as commercial processing laboratories, should have waterproofed floors, as shown. This prevents flooding the room, should a sink overflow, and also promotes cleanliness by making it possible to wash the room down with a hose at intervals. Slatted wooden floor gratings should be used to avoid having to stand on the damp concrete floor.


FOUNDATIONS FOR LIGHTER TANKS REST ON FINISHED FLOOR
TANKS
PLASTER
ASPHALT
WALL
FOUNDATION FOR HEAVY TANKS
1/4" CAULKING COMPOUND
WIRE MESH REINFORC.
1/2" ELASTITE
CLAMPING RING
FLOOR SLAB.
SLOPE BOTH SURFACES TOWARD DRAIN
3-PLY WATERPROOFING MEMBRANE
1 3/4" BASE COURSE
3/4" TOP COURSE IS PLACED MONOLITHIC WITH BASE COURSE

WATERPROOF MEMBRANE SECURELY CLAMPED BETWEEN CLAMPING RING AND DRAIN. CLAMPING RING HAS 3 SLOTS AT BOTTOM TO ALLOW WATER TO DRAIN OFF TOP OF MEMBRANE.

PHOTO-LAB-INDEX, Copyright 1941 - Morgan & Lester

PHOTO-LAB-INDEX No. 15-M-24

WATER FILTERS

Various types of water filters are available commercially, but these do not remove dissolved salts or colloidal matter unless the water has been treated previously with a coagulant.

The simplest type of water filter consists of several layers of fine cheesecloth or cotton flannel fitted over the end of a hose attached to the faucet. Another type, supplied by most photographic dealers, consists of a small metal receptacle, holding a felt pad, sand, or other filtering medium which may be screwed on the faucet.

A large commercial type of filter consists of a metal outer cylinder, a combination cap and guide rod, a filter tube and a cylindrical cover which fits against a gasket on a flange. The feed and discharge connections are arranged in a straight line on the cylindrical cover, which permits installation in a pipe line with minimum alteration in existing piping.

The filter consists of an open helical winding of fluffy cotton thread around a circular wire screen. Water is filtered by passing radially inward through the wall of this tube. Fillers of various degrees of fineness are made by changing the spacing of the thread or including a layer of filter paper inside the winding. A reasonable flow of water for most photographic requirements with this type of filter will be obtained with approximately 40 lbs. water pressure to the square inch.

PHOTO-LAB-INDEX No. 15-M-25

CHEMICAL TREATMENT OF WATER SUPPLY

Water may be purified for photographic — NOT DRINKING! — purposes by the following methods:

METHOD 1

Potassium Alum	**15 grains**	**1.0 gram**
Water	**1 gallon**	**4.0 liters**

This coagulates slime and colloidal organic matter, which carries down suspended particles and clears the solution rapidly. The resulting sludge may be removed by filtration, or left at the bottom and the clear solution decanted from the top. Dissolved salts are not removed by this method. The small percentage of alum introduced into the water has no harmful effect on the solution when subsequently used for mixing developers and fixing baths.

METHOD 2

Sodium Oxalate	**3.34 ounces**	**100.0 grams**
Water to make	**1 quart**	**1.0 liter**

Add the resulting solution slowly to the water to be purified until no more precipitate forms.

This method removes calcium and magnesium salts, as well as coagulating slime, though other dissolved salts are left in solution. Solutions of sodium phosphate and of sodium sulfite may also be used to precipitate calcium and magnesium.

METHOD 3

Most of the commercial water softeners may be employed although such methods do not remove sodium or potassium salts. One of the most satisfactory methods consists in passing the water through a tank containing sodium aluminum silicate (Zeolite) which possesses the power of exchanging its sodium for the calcium and magnesium present in the water. When the Zeolite thus loaded with calcium and magnesium is washed in a strong solution of common salt (about 12%) it exchanges its calcium and magnesium again for sodium and is thus regenerated, whereupon the chemical may be used again for further softening. A compact portable water softening unit working on the principle described is supplied by the Permutit Co., 440 Fourth Avenue, New York City. It may be attached to any household faucet and is capable of softening 100 gallons of water before it needs to be regenerated. Larger water softening units are manufactured by several other companies.

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STONE CEMENT

A satisfactory cement for joining large pieces of soapstone as in constructing a tank or sink, can be prepared from 1 part whiting, 2 parts litharge, thoroughly mixed and made into a putty with boiled linseed oil. A mixture of litharge and glycerine is recommended for cementing small fittings into the tanks.

Oxygenated asphalt can sometimes be used effectively to repair cracks in a soapstone sink. It has the advantage that it expands and contracts slightly with changes in temperature.

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CONSTRUCTION MATERIALS

For Processing Apparatus

Materials for the processing of photographic materials must satisfy two requirements: they must not be attacked by the solution in which they are used, and they must not adversely affect the composition of the solution in question. The table of recommended materials on page 15-25 is reproduced from an article on "Materials for the Construction of Photographic Processing Apparatus" by Crabtree, Matthews and Muehler, published by Eastman Kodak Company.

CONSTRUCTION MATERIALS

For Processing Apparatus (Continued)

CONSTRUCTION MATERIALS FOR PROCESSING APPARATUS †

Solution	Storage Tanks	Pipe Lines	Racks and Hangers Sprockets and Idlers	Pumps Valves and Faucets	Coils
Developer	Wood (Cypress) 18-8 Mo Stainless Steel Iron (ungalvanized) Asphalt-coated wood Lead-lined wood Hard-glazed stoneware Glass enameled steel Rubber lined steel	Iron (ungalvanized) Hard rubber Hard rubber-coated steel 18-8 Mo Stainless Steel Inconel Nickel	18-8 Mo Stainless Steel Inconel Hard rubber Bakelite impregnated fabric Nickel	18-8 Mo Stainless Steel Inconel Hard rubber Iron Monel Nickel	18-8 Mo Stainless Steel Inconel Nickel Monel Lead
Hypo not containing silver	Wood (Cypress) Lead Asphalt-coated wood Hard-glazed stoneware Rubber-coated steel Glass enameled steel Inconel* 18-8 Mo Stainless Steel*	Hard rubber Soft rubber Lead Rubber-coated steel Inconel*	18-8 Mo Stainless Steel* Inconel Hard rubber Bakelite impregnated fabric	18-8 Mo Stainless Steel* Inconel Hard rubber Monel	18-8 Mo Stainless Steel* Inconel Lead Monel
Acid hypo containing silver	Wood (Cypress) Asphalt-coated wood Hard-glazed stoneware Rubber-coated steel Glass enameled steel 18-8 Mo Stainless Steel (with reservation)	Hard rubber Soft rubber Rubber-coated steel 18-8 Mo Stainless Steel (with reservation)	18-8 Mo Stainless Steel* (with reservation) Inconel* (with reservation) Hard rubber Bakelite impregnated fabric	Hard rubber 18-8 Mo Stainless Steel* (with reservation) Inconel* (with reservation)	18-8 Mo Stainless Steel* (with reservation) Inconel* (with reservation)
Water	Same as under Developer	Galvanized iron Soft and hard rubber	18-8 Mo Stainless Steel Hard rubber Inconel Bakelite impregnated fabric	Brasss Hard rubber 18-8 Mo Stainless Steel Inconel Monel	18-8 Mo Stainless Steel Inconel Monel Nickel
Distilled water	Block tin Aluminum (pure)	Block tin Aluminum (pure)		Block tin Tin lined	Block tin Tin lined or plated

† Data for this table were compiled from actual experience of the authors and from information supplied by R. M. Corbin, R. S. Scott, J. Folwell, and others to whom the authors are indebted.

* NOTE: These materials become pitted under certain conditions of use especially with acid fixing baths when the vapors of sulfur dioxide are confined within the apparatus. Of the commercially available alloys, 18-8 Mo Stainless Steel is considered to be the most resistant.

JOINING METALLIC PARTS

Of Processing Apparatus

In the course of a series of tests on metal tanks of a copper-nickel alloy, soldered on the inside with a lead-tin solder, it was observed that if a developing solution remained in the tank for a short time, the developer gave a very bad fog. A series of tests definitely proved that this excessive fog was the result of the tin constituent of the solder going into solution, due to electrolytic action between the solder, the solution and the alloy. When the joints were soldered on the outside, no developer fog was produced, and corrosion was much less.

Of the numerous known alloys, Monel Metal, Inconel, and 18-8 Stainless Steel are the only ones which have been adopted to any great extent for photographic use. The welding of stainless steel must be done carefully, or corrosion may occur at the welded joints. It is essential that the carbon content be 0.08% or lower in order to inhibit the integranular corrosion which occurs at the joints of welded seams due to deposition of excess carbides when the welding heat is applied. For this reason, also, the oxy-acetylene and carbon arc methods of welding are not recommended.

The use of the atomic hydrogen arc with uncoated electrode will result in a very flat seam with a minimum of distortion, and on the whole, very good results. It will be found, however, that there are comparatively few skilled workers for the atomic hydrogen arc welding method. For this reason it will probably not be available in many locations.

The metallic arc method makes use of the ordinary commercial electric arc welding machines. It is well to specify the use of electrodes having the same composition as the metal to be welded—18% chrome, 8% nickel, 3% molybdenum. The electrodes should be coated so that full advantage may be taken of the protective gas which is released by the use of this type of electrode, resulting in a more ductile weld due to the protection from oxidation of the deposited weld metal. Reversed polarity should be used on stainless steel—that is, the work should be negative, and the electrode the positive terminal.

The coefficient of expansion of stainless steel is approximately 50% greater than mild steel. For this reason, in setting up the job due allowance should be made for expansion and contraction.

After the weld has been made, it will be noticed that there is a discoloration along the sides of the weld seam. This is due to the scale which is formed at the high temperature of the welding arc. The scale and excess metal should be removed by grinding.

Where possible, corner welds should be avoided, particularly if the sheets on the inside of the tank are to be polished. In other words, the bottom and sides should be so formed that the joints will come one inch or so from the corners, so that seams will be easier to grind, and a straight butt type of seam may be welded. Stainless steel sheets should be annealed fully, and where the tanks are to be cleaned easily, they should have at least a No. 2-B finish. Care should be taken to use proper welding fixtures and clamps to avoid localized strains and distortion of the tank. For tanks holding 50 to 100 gallons, at least 16-gauge metal should be used.

DARKROOM PAINTS

Kodacoat

Kodacoat paint is made especially for the photographer, professional or amateur. It is supplied in one color only, a glossy black. Kodacoat is economical because if the cap is replaced on the can after use, the paint remains fluid and in good condition for a year or more. It resists photographic solutions and here are a few of the many uses to which Kodacoat has been successfully applied:

1. Coating large trays of building board for developing and fixing enlargements or murals.
2. Water- and chemical-proofing tanks or trays made of wood, stone, iron, cement, tin, etc.
3. Replacing rubber linings in worn-out trays and apparatus.
4. Sealing and making cement tanks and adjacent floors or wall water- and chemical-proof.
5. Chemical-proofing metal funnels and temporary or emergency apparatus.
6. Rust proofing water pipes, gutters, and conduits.
7. Chemical-proofing fabric for photographic uses.
8. Making lightproof curtains without impairing their flexibility.
9. Blocking out windows.

How Kodacoat is Applied

Metal, wood, or similar surfaces must be clean; then treat the surface with coarse emery or sandpaper. Free the surface from grease with a cloth wet with gasoline and apply a priming coat of Kodacoat. When thoroughly set, apply further coats as directed on the label.

Deep, narrow tanks are best flowed by pouring Kodacoat into the bottom of the tank and slowly allowing it to coat each side in turn while tilting the tank. In such deep, narrow tanks, drying is retarded due to the heavy solvents which prevent the paint from drying by collecting in the bottom of tank. To prevent this, lay several thicknesses of newspaper on the floor, invert the coated tank on props so that the mouth of the tank is at least six inches above the floor. This speeds drying by allowing the solvents to settle out of the inverted tank, or an electric fan can be used to divert a current of air into the tank.

Tanks of galvanized iron or tin are best given a first coat of bridge rustproof paint, such as can be purchased from a local paint store. Kodacoat is then applied over this primer.

After a sufficient body of Kodacoat has been applied to a surface and dried, the Kodacoat may be melted in, if desired, by applying the open flame of a blowtorch. Heat softens but does not harm Kodacoat.

Buffer Proofing with Kodacoat

In making large wooden hypo tanks, drainage shelves, or sinks, or where excessively hard wear is to be expected, the buffer cloth method gives best results. Apply a heavy coat of Kodacoat to the inside of the tank. While it is still wet, carefully smooth a layer of cloth toweling or light canvas, cut to fit the bottom and sides of the tank, over the fresh paint. The lining should be cut so as to allow wide laps sealed with paint. Where drain outlets are necessary, the buffer cloth is applied closely around the hole before the metal fittings are installed. Press the cloth into contact with a heavy flatiron. Carry the cloth liner over the edges of the tank and down the outside for two to three inches. When the cloth liner has dried into position (overnight), apply one or two coats of Kodacoat over the cloth. A blowtorch flame may be used to melt the dried Kodacoat into the cloth if so desired. When applying Kodacoat, do not brush it out like a paint but flow it on like a lacquer. It sets quickly. Kodacoat (black) covers approximately 250 square feet per gallon.

Panchromatic Green Paint

Among the various colors suggested for use as a wall and ceiling paint for dark rooms, red, orange, white, and black have been commonly used. All of these are objectionable. In order to scientifically standardize darkroom painting, Panchromatic Green paint has been developed by serious research. Kodak's new darkroom wall paint, Panchromatic Green, automatically safeguards photographic work. This wall paint reflects light of approximately the same color as that transmitted by the Wratten Series 3 Safelight and, therefore, represents the safest paint for darkroom walls. A faint green light appears much brighter to the eye than other colors of equal photographic intensity. The pigments selected for Panchromatic Green paint produce a scientific wall paint reflecting the safest colored light and allowing greatest seeing power.

Walls painted with Panchromatic Green appear light green under the Wratten Series 3 illumination, dark gray when the room is lighted with a red safelight, and a pleasing light gray with a yellow safelight. Hence, such a darkroom may be used with entire satisfaction for the handling of all types of negative and positive materials. Panchromatic Green covers approximately 350 sq. feet per gallon.

How to Paint the Darkroom Correctly

On side walls for about three feet up from the floor and including the baseboards, use Kodacoat. Carry the Kodacoat higher around sinks or wherever splashing from solutions may be expected. This creates the dimmer "handling zone" and protects these surfaces from corrosion by splashed chemicals and allows such surfaces to be cleaned with soap and water.

On side walls from three feet up to the ceiling, use Panchromatic Green. Carry it over the ceiling or use white on the ceiling if you are certain your safelights have no leaks.

Table or bench tops or wherever films are to be handled should not be painted. Cover these with a good grade of linoleum, green or gray in color. If desired, these linoleum tops may be further protected with a coating of Kodalak W.P., Eastman's invisible protective lacquer.

Sides of tables, benches, furniture, and all projecting surfaces should be painted with Panchromatic Green. So painted, such articles are easily visible in the panchromatic lighting.

In other words, Kodacoat should be used where protection from chemical splashing is required, and Panchromatic Green on areas which are to be made highly visible under panchromatic lighting.